INTEGRATED MISSION ANALYSIS

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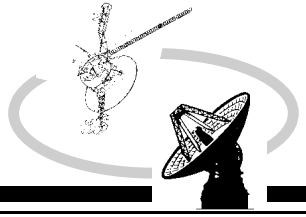
TMO Technology Program Quarterly Review

January, 1998

Integrated Mission Analysis
Objective and Significance

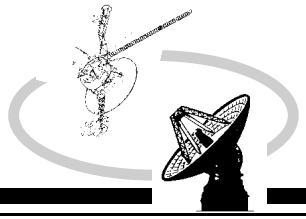


Overall Objective

Improve efficiency of software design, development and operations for a collection of TMOT tasks relating to mission analysis, planning, and DSN scheduling. Use a common database (MADB) and integrate tools across tasks.

Goals	Significance
• Provide better integration of short-term DSN scheduling with long-range scheduling	• Promotes efficiency in TMOD resource allocation
• Develop telecom link analysis tool (LinkScape) and integrate with MADB	• Develop method to evaluate and display uncertainties; reduce redundancy in sources for telecomm data
• Develop a Service Request Processor (SRP) prototype for requesting, analyzing and managing standard TMOD services	• Automates the service request process by operating in a single environment (web-based) and accessing a central db (MADB)
• Prototype and integrate mission design tools into the integrated MADB/SRP environment	• Provides direct linkage of new mission design tools to MADB

Integrated Mission Analysis
Products and Customers



Show any changes to this in RED.

		Development Phase				
Product	***User/Customer***	Concept	Design	Demo	Transfer	***Approach/Comments***
		■				

Integrated Mission Analysis
The "Big" Picture

Fill Codes:
- Flight
- Ground
- Flight & Ground

Check all that apply:
- ☒ Automation
- ☐ Autonomy
- ☒ GSE
- ☒ Development
- ☐ Operations
- ☒ Flight
- ☒ Ground
- ☐ H/W
- ☒ S/W
- ☐ Protocol
- ☐ Testbed

(Flight, Ground: For SE trades)

Avionics

Instrument

Telecom & Relay

For UTP

Ant / Optics

Rcvr

Xmtr

Networks

Nav & Trk

Cmnd

Telemetry

Schedule

Plan & Seq

Data Mgmt

Miss Des

Eng Proc

Sci Proc

Analyze

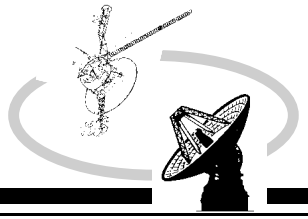
Visualize

Data Prod

Other Infra

Mon & Cntrl

Integrated Mission Analysis
Relevant Technical Skills



Describe the set of technical skills that are relevant for this work area and available in the section(s) that are supporting this work.

- **Systems Engineering**
- **Mathematical Modeling and Optimization**
- **Telecomm Analysis**
- **Artificial Intelligence**
- **Mission Design and Analysis**
- **S/W Architecture**
- **Database Design**
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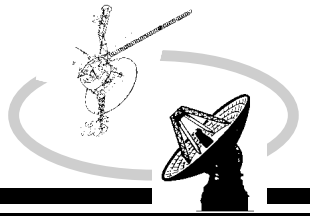
-
- **Sections supporting this work area include:**
    - **311, 312**
    - **331**
    - **393, 395**

Integrated Mission Analysis
FY98 Q1 Accomplishments



DSN Automated Scheduling: Steve Chien

- ✓ **Participated in the design of the Deep Space Terminal (DS-T) Automation Layer Architecture**
  - **DANS will be used for rescheduling. Preliminary integration into DS-T automation layer was completed in the AI Lab.**
  - **Aspen will be used for the track script generation process**
- ✓ **Began a set of meetings on integrated RAP/DSN Scheduling**
  - **Participants include Sec. 311 Operations Research Group and Sec. 395 Artificial Intelligence Group**
- ✓ **Completed work plan for schedule editing capability into NPP D3**
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Advanced Comm Strategies: Fabrizio Pollara

- ●●● **No work done in Q1**
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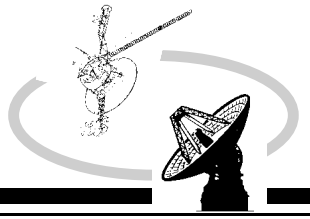
Integrated Mission Analysis
FY98 Q1 Accomplishments (cont'd)



Service Request Processor Prototype: Chet Borden

✓ • **Demonstrated initial SRP prototype capabilities to TMOD System Engineering Working Group**
  - **Demonstrated generation of service request, prototype resource mapping for telemetry and command services, SR approval/rejection management, and PVL report**

\+
  - **Initiated TMOD Services and Resource Allocation System integration effort**

✓ • **Initiated design of improved graphical user interface for SRP**

✓ • **Participated in meetings on integrated RAP/DSN Scheduling**

✓ • **Continue to structure and implement analysis of services**

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Mission Planning Service: Greg Garner

••• • **No work done in FY98 Q1.**

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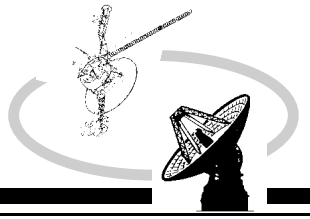
Integrated Mission Analysis
FY98 Q2 Planned Accomplishments



DSN Automated Scheduling: Steve Chien

- **Continue 395/311 work to complete plan for developing integrated RAP/DSN Scheduling capability**
- **Test DANS and integrate in DS-T Automation Layer. Integrate schedule editing capability into NPP D3 software**
- **Integrate ASPEN into DS-T Automation Layer**
- **Present paper on DS-T architecture at IEEE Aerospace Conference**
-

Advanced Comm Strategies: Fabrizio Pollara

- **Develop bit error rate performance calculation module for LinkScape**
  - **Note: LinkScape is a software tool designed to enable telecom link designers to easily and rapidly test new conceptual designs for deep space communications. It is available on the web.**
  - **Continue to study integration with MADB**

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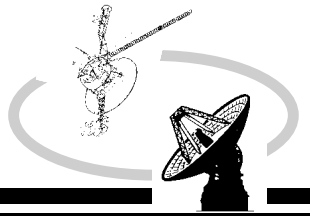
Integrated Mission Analysis
FY98 Q2 Planned Accomplishments (cont'd)



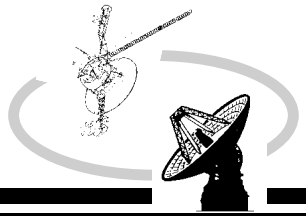
Service Request Processor Prototype: Chet Borden

- **Initiate design and development of resource mapper integrated with MADB**
- **Initiate design and development of direct connection of UTP with SRP (Kar-Ming Chung)**
- **Review and update list of service parameters for redundancy, source, required vs optional, stage required, etc.**
- **Create strawman reports from MADB database**
- **Continue with the following:**
  - **structure and implement analysis of services**
  - **test case study**
  - **design and implement GUI for mission users**
  - **development of common framework for SRP and Resource Allocation System**
  - **—**

Mission Planning Service: Greg Garner

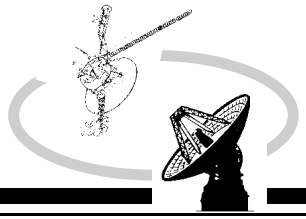
- **TBD**

Integrated Mission Analysis
Schedule



Task	FY98 Expanded
	Q1 | Q2 | Q3 | Q4
Major task description	
Subtask 1	Note
Subtask 2	
Next major task	
Slipped w.r.t. original FY98 plan	Comment
N.B. Show expanded plan for FY98 and progress against plan for all identified work items. This information should come from your Annula Review schedule. Where re-planning has been required show this using a red broken line (as shown).	
Resources by FY ($K):	xxx

Integrated Mission Analysis
FY98 Q1 Scoring Approach



For this quarterly report DO NOT create a separate Scorecard page. instead use these scoring symbols to indicate the status of the items that appear on the Q1 Accomplishments and Q2 Plans pages. Any replanning should also be reflected (in red) on the expanded FY98 schedule.

✓ **Planned accomplishment #1 (from FY96 Annual Review)**

(Use this icon for successful accomplishment; include additional explanatory words on status only if required)

●●● **Planned accomplishment #2**

Status(e.g., Procurement delays; use this icon for partial completion/schedule slip where you still intend to complete task. Include new goal date for completion.)

X **Planned accomplishment #3**

Status (e.g., Task cancelled after loss of Mars Observer; use this icon for tasks not accomplished, where there is no intent to complete)

\+ **Planned accomplishment #4**

(Use this icon for tasks not originally planned in FY96 TDP, but added as goal mid-year based on new knowledge and/or added resources)